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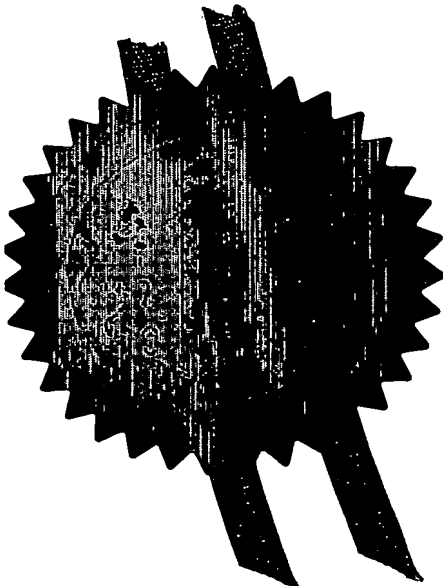
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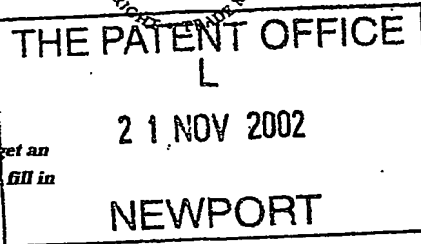


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2. Patent application number

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0227182.3

21 NOV 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Hamid Rassoulia

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Southampton, SO16 7LY

United Kingdom

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

An ergonomic aid to reduce shoulder and torso loads for operators working in static working postures

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

0851 0844001

Patents ADP number (if you know it)

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Country

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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

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a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

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Description

Claim(s)

Abstract

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

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Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

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Ransoul'ian

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Dr. Hamid Ransoul'ian
07803 609833

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Title: An ergonomic aid to reduce shoulder and torso loads for operators working in static working postures.

Description

Background

The present invention is intended to provide a means of partial load relief for the shoulders and upper torso of those individuals who work in a static posture. The main beneficiaries of this invention are dentists, dental hygienists, maternity ultrasonographers and surgeons. Individuals in these professional groups are at risk of developing musculoskeletal pain and injuries in the shoulders, neck, upper and lower parts of their torso.

Various studies have shown that back pain is a major cause of disability and absenteeism in industrialised countries. Ergonomic studies have also shown that workers with awkward static working postures are at high risk of developing musculoskeletal problems. The above mentioned professional groups, and in particular dental health professionals work with a slightly flexed torso and abducted arms. This awkward abnormal posture which needs to be maintained while treating patients or undertaking the clinical procedure places excessive loads on the musculoskeletal structures of the shoulders, and the torso.

Disadvantages of previous inventions

Previous efforts to prevent or reduce excessive loading and the associated musculoskeletal problems of the shoulders and the torso in these professional groups have not been conclusively successful. The main reason for this lack of success is often the restriction that the solutions present to the worker or operator (for example the dentist) in carrying out their work. In addition the limited functionality of these devices present some risks for accidents to occur. For example some inventions add some features to the dentists' chair or stool that are of no benefit when patient's mouth is being accessed. These stools may provide some level of load relief only when the dentist is not treating the patient or accessing the mouth. Other solutions and inventions offer arm and elbow support that may also be adjustable and swivelling. These restrict arm movement as they necessitate resting of the arm on the support whilst working on the mouth. Using these devices the dentist would need to operate on the mouth while keeping the arm and elbow stationary. This is indeed a further restriction of posture which explains how and why such devices defeat their own purpose.

In some inventions the swivelling action which is claimed to add functionality can be a potential cause of accidents. When the dentist's arm is on the swivelling support and the work requires him/her to move it in order to move the tools within the mouth, it can prove an impossible task for the dentist to return the arm back on the armrest without looking at it or using the other arm to reposition it. Any attempt to return the arm to the armrest whilst applying a tool to the patient's mouth can be harmful to the patient. Furthermore, attempts to load the armrest, as is intended, whilst applying a tool in the patient's mouth may cause movements of the armrest thereby destabilising the dentist's arm, with potentially disastrous consequences.

The present invention

The present invention provides a means of support for the operator's arms that is, functional, non-restrictive, ergonomically positioned and safe to use. It provides a support surface for the operator's arms regardless of his/her position or angle of approach to the operating area.

The preferred application of this invention is to provide arm support for dentists and dental hygienists and dental nurses and dental assistants hereinafter called the operator.

The main feature of the present invention is a support surface that locates around, over or in the proximity of the operating area (that is the patient's mouth) so that the operator may rest his/her arms on it as and when required.

The preferred field of application for this invention is dentistry. In this application, the support surface locates around the dental chair's headrest so that the operator can rest his/her arms on it while accessing the operating area (that is the patient's mouth). The support surface may be built into the dental patient chair's headrest and/or backrest. However, its preferred embodiment is an assembly of components making up a device that maybe attached to existing patients' dental chairs or operators' stools. Other variations of the present invention may result in a stand alone device with its own floor standing base.

The support surface may be either a single continuous surface or a plurality of surfaces providing support for one or both arms of the operator. The support surface may be in the form of a continuous surface similar to a frame such that when applied or installed in its intended position it locates around the face and head of the patient. The support surface may be similar to a complete or an incomplete circular frame. The support surface may be curved with varying radii of curvature in order to maximise the ergonomic advantage provided to the operator.

In other variations of the present invention, the support surface is a plurality of small rigid elements hinged together to form a chain like structure. This will make the shape and orientation of the support surface variably adjustable in the horizontal plane while keeping its structure rigid in the vertical plane.

The second feature of the present invention is a link that connects the support surface to the rest of the assembly. The link may be a straight tube or a rod of any cross sectional geometry and made of any material. The preferred embodiment of the link is a tube that maybe made of a strong material for example stainless steel.

The third feature of the present invention is an adjustment means that connects the link to the rest of the assembly and allows the support surface to be moved and repositioned or removed from the assembly.

The fourth feature of the present invention is a frame which is used to hold the assembly together and to connect it to any other structure.

The various parts of the present invention are now described with reference to figures(1-6). Four main parts are referred to as: 1-Support surface, 2- Link, 3- Adjustment means, 4- Frame.

Figures

Figure-1

Support surface assembly for attachment to operator's stool or the side of the patient's dental chair.

Figure-2

Variation of the assembly of figure-1.

Figure-3

Support surface assembly attached to the operator's stool.

Figure-4

Assembly for attachment or positioning over and next to the patient's dental chair.

Figure-5

Side elevation of figure-4.

Figure-6

Variation of the assembly of figure-4.

1 - The support surface

This provides support for the arms of the operator. The support surface or surfaces may be curved or shaped in a form to provide a continuous support surface for the operator's arms. In the preferred embodiment of the present invention the support surface is curved similar to the arc of a circle. The support surface may be continuous as in figure(1) or there may be a plurality of support surfaces, for example one for each arm as in figure(2).

In the preferred embodiment of the present invention the support surface is a plurality of surfaces each describing an arc and each attached to the frame through a link and an adjustment means. The support surfaces locate around the patient's head and under the forearms of the operator.

2 - The Link

The link provides a means of connecting the support surface to the adjustment means. The link may be part of the support surface or it may be attached to it by screws or glue

or welded to it. If the Link is attached to the support surface by a screw then it would be possible for the support surface to move with respect to the link, as in a translation along or rotation about an axis (y1) in figure(2).

3 - Adjustment means

This mechanism allows movements of the link with respect to the frame to occur. Different variations of the adjustment means are possible. Its simplest form is a sleeve into which the link is located as shown in figure(1) and figure(2). Since the length of the sleeve can be large then the link can also move linearly into and out of the sleeve as well as rotationally about the sleeve. A small screw such as a grub screw into the body of the sleeve can provide a way of fixing the link's position. In other examples the adjustment means may be a hinge mechanism allowing rotational motion as in figure(4) figure(5) and figure(6).

Different variations of the adjustment means make it possible for the support surfaces to be: a) detached and removed, b) to slide up and down, c) to slide sideways and rotate out of the way or d) to rotate up or e) sideways out of the way. These variations may include mechanisms for facilitating its function.

4 - The Frame

The frame attaches to the chair or the stool and provides a means of secure attachment for the rest of the components of the present invention. In one example the attachment of the frame to the chair may be by means of a clamp system.

In the preferred embodiment of the present invention the frame is integrated into the operator's chair or stool as shown in the figure(3). When the stool is being used the operator is seated facing the support surfaces with legs on either side of the frame. In this position the support surface locates under his forearms as he leans forward to access the mouth. It is normal practice that when the patient is on the dental chair, the chair is positioned similar to a bed so that the patient's head locates in front of the dental operator and at approximately the same height as his/her torso.

Ergonomic advantages of the present invention

The present invention, provides rigid support surfaces below the operator's forearms. The operator can rest his/her arms anywhere on these surfaces whilst applying tools to the patient's mouth. These support surfaces always locate under the operator's arms or forearms when he/she is accessing the patient's mouth. At the same time the operator is free to move away from the patient and return without having to readjust the position of the support surface.

Variations of the present invention

In different embodiments of the present invention the support surfaces may be separately detachable independent of each other. They may also be adjustable in their orientation independently of each other (figure-2).

In one example of the present invention the support surface may incorporate clamps or other attachment accessories for the attachment of trays, bins and containers. Also the support surface may incorporate a magnet or have a partially or completely magnetised surface for

holding of various tools while the operator is undertaking different procedures. In this variation where a magnet is used or parts of the support surface are magnetised, a metal tray maybe used to hold the operators tools. The purpose of the metal tray would be two fold: (1) To provide a more substantial surface for tools while the magnet can hold both the tray and the tools; (2) The tray and the tools may be decontaminated in order to avoid cross contamination between the patients.

In another example the present invention maybe an assembly which can replace the headrest of the patients' dental chair. In such arrangement the frame would be inserted into the same sleeve that holds the headrest (figures 4-6). A cushion which may also be adjustable can be mounted on the frame in the appropriate position (not shown in the figure) for the patients' head. Once in position the patient's head locates between the two support surfaces (1) (see figure-4). The curved surface locates above the patients' head and the other surface which can be rotated up and over the head is positioned over the neck or upper chest region of the patient. Once the operator has completed treating the patient the link (2a) can be rotated about the adjustment means (3) out of the way to clear the way for the patient to leave the chair. The link (2b) can also be adjusted up or down as the operator requires. In a variation of this example the links (2a) and (2b) may be connected so that both rotate out of the way and on the opposite side of the frame behind the chair when the operator has completed the treatment. In an alternative variation the links (2a) and (2b) may only be connected to one side of the frame (4).

In a different variation of the present invention the assembly may be a stand-alone device such that the frame (4) is connected to base located on the floor.

In a different variation of the present invention the support surfaces may both be curved and the link (2a) may be shaped such as to ensure it remains above the plane of the frame (4) to avoid contact with the patient's shoulders (see figure-6).

In a different variation of the present invention the support surface may be incorporated into the headrest of the patient's dental chair. In such a configuration the cushion which holds the head may have significantly pronounced edges on the top and its sides providing partial support for the operator's arms. This variation may also incorporate a hinged link (as in figure 5 or 6, link 2a) for a second support surface that locates in front of the patient's neck and chest providing support to the other arm of the operator.

An alternative variation of the present invention would be suitable for dental chairs that have no separate headrest. For such chairs the present invention would be clamped or bolted to the back rest of the chair such that the frame(4) (see figure-6) would locate behind the area of the chair where the patient's head rests. The link (2a) would then be rotated into position in front of the patient during treatment and rotated back out of the way for the patient to leave the chair.

In another example of the present invention the assembly may be distributed between the patient's dental chair and the operator's stool, each incorporating one of the two support surfaces. In such a configuration the operator's stool would incorporate the assembly of figure-2 with the right hand link and the associated support surface and the other support surface would be provided by an assembly similar to that shown in figure-4 with the left hand surface and link (2b).

A different variation of the present invention is realised when the frame (4) is in two parts and can be telescopically elongated and shortened.

Another example of the present invention is when the assembly of figure-4 or the assembly of figure-6 have the adjustment means (3) attached to a sleeve that can slide along the frame (4). Such an arrangement permits the adjustment of the separating distance between the support surfaces (1).

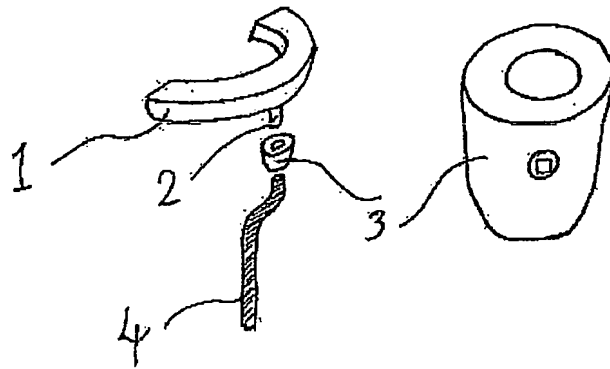


Figure 1

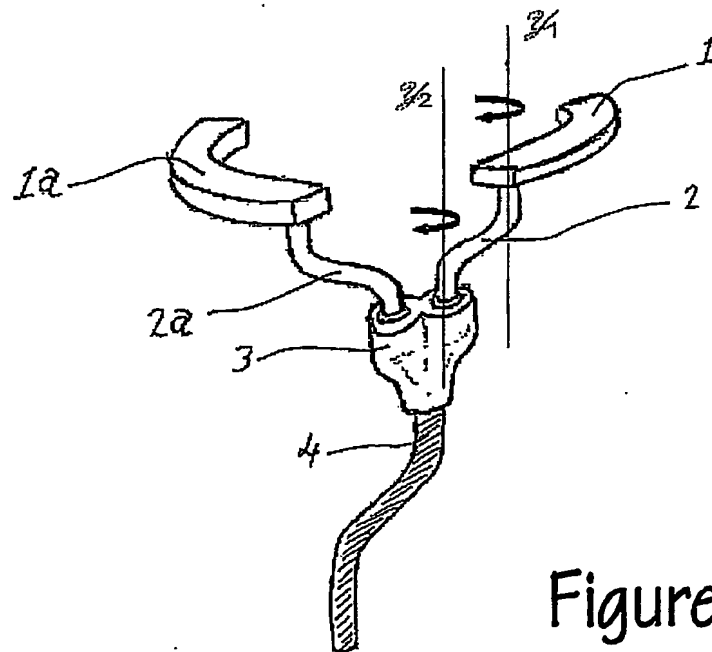


Figure 2

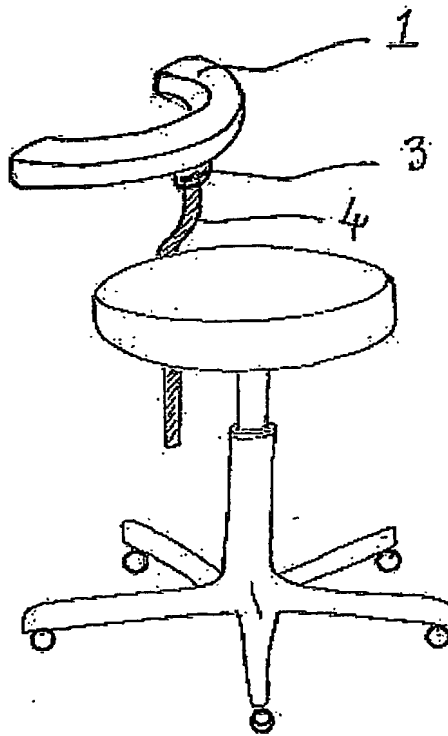


Figure 3

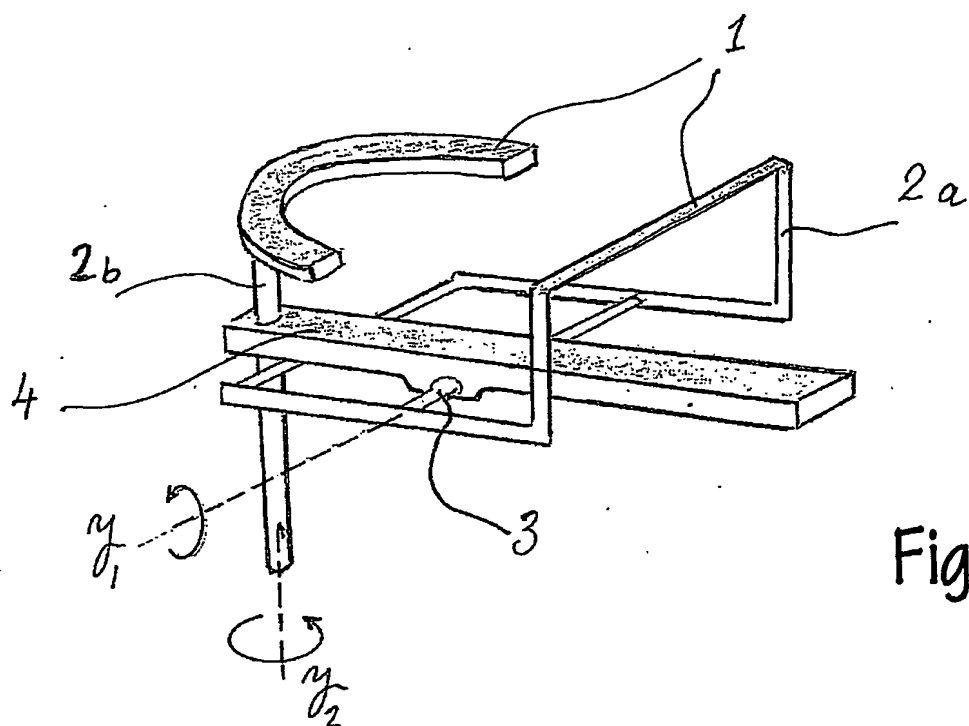


Figure 4

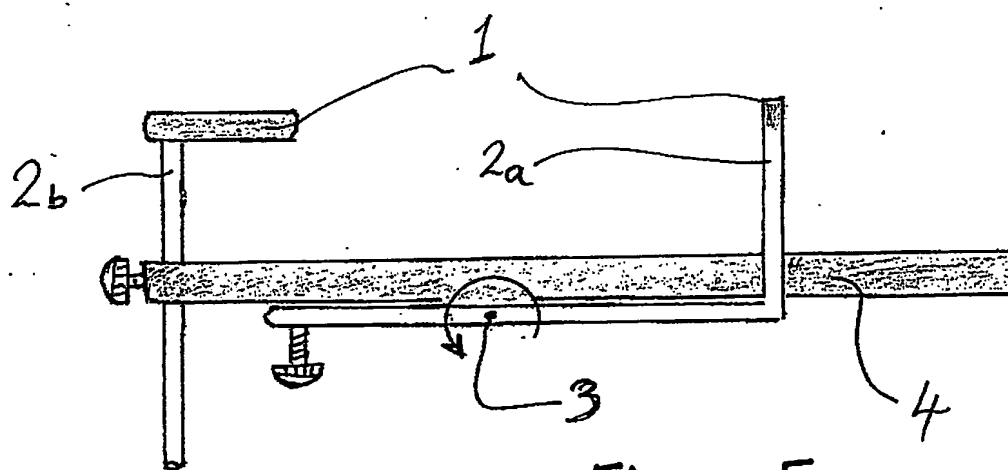


Figure 5

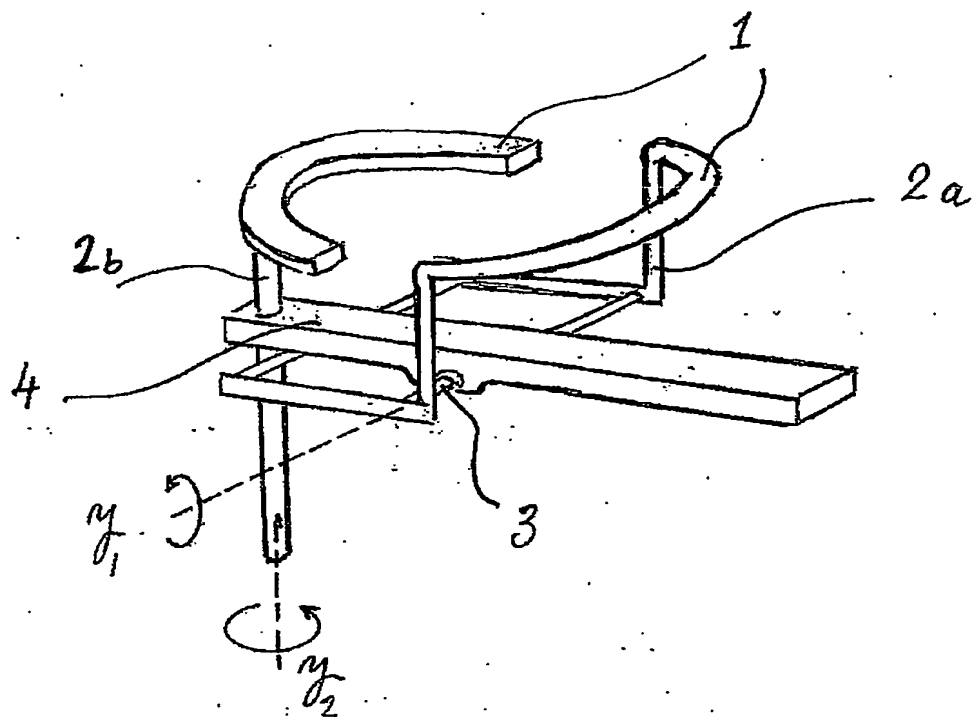


Figure 6

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